



POLLUTION PREVENTION REPORTER

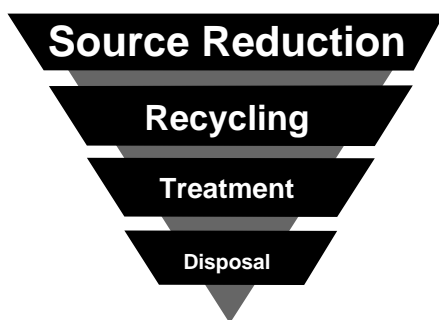
Waste Minimization/Pollution Prevention (Wmin/PP) Information Vol. II • No. 3 • September 1995

by Bill Baker (MST-6)

One of the first critical questions the Laboratory asks when the DOE assigns new programmatic deliverables is, “What is the impact on the environment?” Recently, the metallurgy group (MST-6), in the Materials Science Technology Division at the Lab, has been given many additional mission requirements and deliverables for DOE’s Non-Nuclear Reconfiguration Program. Much of the additional work involves electroplating and surface finishing operations at the Sigma Complex.

We have already analyzed the consequences of conducting these activities—namely, the kind and amount of wastes that will result and what we can do to mitigate the overall environmental impact. One solution that would go a long way toward minimizing the environmental effect would be the establishment of a full-scale, closed-loop recycle system at the point of origin of liquid “listed” wastes.

Currently, we are working with the Environmental Management (EM) Program's Pollution Prevention



Program Office (P³O) to secure a funding source to allow development of this waste treatment system at the Sigma Complex. The P³O staff helped us develop a proposal to provide funding from the Lab's indirect budget, but that was not successful. However, P³O's Michelle Burns and others showed us another route: the Return on Investment (ROI) Pollution Prevention Project. Our proposal has been favorably reviewed for these ROI funds, and we hope to learn shortly that we are successful.

However, the EM Office is not assuming this funding will be secured, so EM Program Director Tom Baca and Deputy Director Reed Jensen are diligently exploring other avenues. They believe so strongly in this waste-treatment effort that they presented our proposal to Tom Grumbly, the Assistant Secretary for Environmental Restoration/Waste Management of the Department of Energy and asked for direct funding.

In essence, this project would establish a closed-loop, recycle treatment system for the liquid effluents from the electroplating area in the Sigma Complex with expansion capability to handle all effluents from Sigma. This point-of-origin treatment system would mean no effluents from Sigma would be discharged to TA-50, the Liquid Waste Treatment Facility at the Lab. See Figure 1.

Currently, Sigma has a successful pilot program using an evaporative reclamation technology that treats these hazardous, "listed" wastes

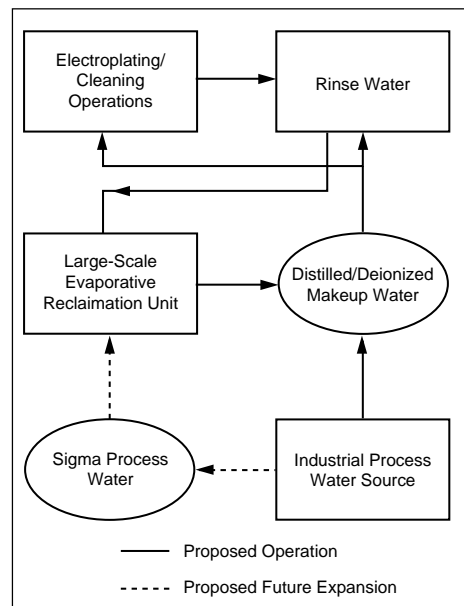


Fig. 1 Proposed closed-loop recycling activity.



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coming from our electroplating area. But that small-scale operation cannot handle any more. In fact, we have already been noticing a critical loss of purity of the rinse waters since the start of the Non-Nuclear Reconfiguration Program. Thus, we realized that we had to either increase the system's capacity for handling these wastes, discharge Sigma's rinse water to TA-50, or inform the DOE we could not handle the new activities of the Non-Nuclear Reconfiguration Program.

Analyzing the Options

In reality, discharging these wastes to TA-50 has never been a viable option as these effluents do not meet the waste acceptance criteria for that facility. This is because Sigma's listed wastes, combined with radioactive wastes at TA-50, produce mixed wastes. At this time, TA-50 is not permitted to handle mixed waste, yet we would be generating some 300 barrels annually. Moreover, these wastes would fill the Lab's permitted mixed-waste handling capacity within 18 to 24 months. Thus, without implementing our point-of-origin treatment, either TA-50 would be shut down or new permitting would be required. Yet, it is doubtful that TA-50 could even be granted a permit to handle and treat mixed wastes on a daily basis because of the age of the facility and because of its inability to meet criteria established for mixed waste treatment.

Another unreal option would be for LANL to inform the DOE it cannot take on the new responsibilities involved in the Non-Nuclear Reconfiguration Program. The DOE

would then be forced to find the same expertise—which does not exist—at another site and move the program activities there. This site would then confront the *identical* waste dilemma that we have. This was one of the issues that shut Rocky Flats down. Additionally, when the operation was moved from Rocky Flats to LANL, it cost \$20M. To move it anywhere else, it will cost more than \$20M, and the DOE will still not have solved the waste problem.

Thus, the only viable option is to increase the pilot program's capacity. By increasing the system's capability, these listed wastes could be treated and recycled for use at the electroplating area. Lab permitting personnel have reviewed this project and determined that the establishment of this capability within the Sigma Complex will not require licensing. Foregoing the licensing procedure will allow us to perform an expeditious installation and startup of the equipment.

Background on the Pilot Project

Project termination almost became a reality in late 1993 when the waste management staff realized that effluents from our electroplating group were generating a mixed waste issue at TA-50. The TA-50 facility was nearing the point of total shutdown as it was not permitted to process mixed wastes. This facility not only treats wastes from Sigma but from most of the Laboratory because shutdown was a critical problem. In order for TA-50 to remain in operation, we had to cease disposing of our rinse water. Thus, a serious issue was created for our group as loss of this capability would eliminate cleaning and electroplating operations in Sigma.

In order to maintain this capability, we had to develop techniques that would

eliminate rinse water discharge. We evaluated two commercial technologies—ion exchange and evaporative reclamation—because of their acceptance within industry. Both processes were scaled to operate on a 50-gallon-per-day processing rate. We purchased the ion exchange unit based on its strong acid/strong base exchange media. Evaluation of this unit over a one-month period did show an effective method; however, disposal of spent exchange media was an issue. Salinity of rinse waters was an undesirable byproduct as well.

The evaluation of the evaporative technology began after receipt of an industrial version of a commercially available unit. This version was designed with a Hastalloy reaction vessel and an oversized vacuum pump. All other modifications were minor. The unit utilizes the "cold evaporation" technology that evaporates water under partial pressure and reclaims it in a refrigerated chamber. This unit was plumbed to all rinsing operations where automated fluid transfer could take place. The product of this type of operation was pure water and a sludge that could be returned to the process solution of the associated rinse tank or packaged and treated as waste. This technology has proven to be quite acceptable in application because of its ease of operation, low maintenance, and its ability to recycle rinse water completely. The unit has been in operation for over one and one-half years with only prescribed maintenance.

Under this project, we plan to increase the pilot system's capacity, which will not significantly change the flow chart. Our plans will be to replace the pilot unit with a larger-capacity evaporative

reclamation unit. This unit will handle our increased needs in electroplating and will also allow for expansion to handle all liquid effluent from the Sigma Complex as seen in Figure 1.

Project Benefits

- The ability to treat an increase in wastes resulting from an increase in deliverables demanded by the nuclear weapons programs,
- The ability for Sigma Complex to treat its own "listed wastes" and not have to send these to TA-50 where the treatment produces "mixed wastes," which are not permitted to be handled at TA-50,
- The ability for Sigma Complex to recycle and reuse an estimated 5 million gallons of water annually just from the electroplating activities with potential for additional recycling of all the effluents from the complex, and
- Cost savings if this project is implemented of about \$1.02M annually, with an expected payback period occurring the first year of operation.

Conclusion

Finally, there's an underlying emphasis in the weapons programs to develop and use technologies that foster a waste minimization approach. For example, unique fabrication processes are being used that minimize the amount of feedstock removed in machining operations, provide weldments of equal characteristics, and produce cleaned components without the generation of mixed wastes. Although these programs have been successful, the cost of disposal and treatment of waste has still gone up. Treatment of waste off-site will continue to increase the cost of doing business. Thus, it is vital to implement recycling and reuse

wherever possible to maintain capabilities to support the nuclear weapons programs. This point-of-origin treatment system features recycling and reuse of all water used in the Sigma Complex.

Chemical Exchange Assistance Program and External Recycling is CHEAPER

by Jay Stimmel (DX-16)

There are two new developments in the CHEAPER program. First, the program now has a central storage facility (located at TA-3) for chemicals in demand. Chemicals at this facility include common solvents, alcohols, and acids, such as acetone, ethanol, and hydrochloric acid. Storage here permits the immediate removal of surplus chemicals from the user's storage area and makes the chemicals readily available for chemical exchange requests. The processing time for chemical exchange requests has been decreased considerably. Some requests have been filled in less than a day.

The second new development is the Pollution Prevention Program Office's "little red wagon." The "wagon" is used to move chemicals around the TA-3 area. Following Laboratory Director Sig Hecker's directive to increase productivity and Vice President Al Gore's efforts to streamline government regulations, the CHEAPER program is continually striving to make the program "cheaper" and more efficient. The use of the wagon reduces the costs and time required for chemical exchanges while maintaining the safety of the exchanges. Group BUS-4's mobile packaging van will also continue to transport chemicals.

Chemical users should keep the CHEAPER "wish list" in mind. If you require any chemicals on a regular basis or need a chemical that isn't currently available, please have your name added to the wish list. You will be contacted as soon as the chemical becomes available. Wish list requests may be made by e-mail through (cheaper@lanl.gov), or from the chemical exchange home page (<http://perseus.lanl.gov/PROJECTS/ACES>), by phone (7-8293), or by fax (5-6727).

The program is expanding to include additional materials. It currently has empty containers available from four ounces to 55 gallons. There are also thermometers available. The list of available materials is on the World Wide Web of the Internet. It may be accessed through "Info by Subject" on the LANL home page under Chemical Exchange Browse Screen. The list may also be accessed at <http://perseus.lanl.gov/PROJECTS/ACES>.

Reusing Contaminated Scrap Metals Can Reduce Waste

by Gilbert Montoya (CST-14)

Melting Makes the Most of Scrap Metals

The Solid Radioactive Waste Management Group (CST-14) in the Chemical Science and Technology (CST) Division operates the Laboratory's solid radioactive waste management facilities at TA-54, Area G. Area G is the only approved Laboratory disposal site for burial of solid, low-level radioactive waste generated at the Laboratory. Area G is also the interim storage site for transuranic waste to be shipped to the Waste Isolation Pilot Plant. Located on Mesita del Buey at TA-54,



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Area G has been managing solid radioactive waste since 1957 and will remain the Laboratory's solid radioactive waste management area.

Decommissioning of nuclear installations produces large quantities of contaminated and activated steel and non-ferrous metals. Treating these materials as radioactive waste causes problems at TA-54, Area G, because of the limited capacity for disposal. Recycling metals by remelting or decontamination provides a useful alternative.

Use of Waste Containers from Contaminated Scrap Metal

DOE is proposing a policy to promote the reuse of radioactively contaminated scrap metals within the Office of Environmental Management. The DOE has a target to make 50% of waste containers (BV-25 boxes and 83-gallon overpacks) from radioactive scrap metal (RSM) by the year 2000. Such recycling will accomplish the reuse of scrap materials from the decommissioning program and provide storage and disposal containers for the Environmental Restoration and Waste Management Programs, as well as providing close control of storage/disposal and handling of RSM. The objectives of recycling incorporate the following:

- Resource recovery through conservation of virgin materials by converting wastes into assets,
- Minimization of the contamination of new materials,
- Reduction of environmental impacts associated with mining and milling of replacement ores,
- Waste minimization, and

- Conservation of the nation's valuable disposal capacity.

Group CST-14 in conjunction with the Metal Recycle Waste Minimization Program of Westinghouse Idaho Nuclear Company, Inc., is proud to take a lead in realizing these important objectives.

What Is a Process ID, and Why Do We Need It?

by Tom Nolen

The P³O recognized in 1993 through the Waste Management Services Team's activities that waste production was being tracked by the Waste Profile. This approach to database tracking works well for waste disposal, but it does not identify processes where the waste production needs to be reduced or eliminated. Waste profiles are affected by changes in personnel, budget, and organizational restructuring. Reporting is cumbersome and requires in-depth programming to ferret out specifics of waste production.

The primary concern of P³O has been to track waste to its origin regardless of when it was generated. The Program Office introduced the Process ID as a method of tracking the production of a waste from its location and process. By issuing a Process ID for each waste process, P³O may identify recurring waste production from "one-time" generation and from intermittent generation over a number years. If people leave or change jobs, if the Laboratory restructures its processes and procedures, or if budget constraints eliminate a waste-producing process for a budget year

and it resumes in another, the Process ID will force reporting at the time of disposal. While the waste profile documents are key to charge-back to specific budgets, they are not the mainstay of the Process ID Database.

A "process" is defined as the series of events that produce a product. The primary process at LANL is research. The secondary process may be the production of a toxic, hazardous, radioactive or environmentally unsafe byproduct. The DOE and the University of California (UC) want LANL to clean up and manage its waste responsibly. In some cases hazardous, toxic, and/or radioactive wastes have been here for 50 years. It is LANL's responsibility to clean it up and manage it. The use of a Process ID is one way to manage wastes by tracking the production at its source.

The UC is adamant about LANL's role as an environmental custodian to the point of insisting that division managers' participation in environmental management will be evaluated as part of an ongoing annual performance criteria. This is also the reason for the environmental emphasis in the UC Performance Measures. The DOE has provided funding for waste management with varying degrees of uncertainty because the actual results of waste management have been difficult to assess. The Process ID is a means to track actual waste production and to determine if it actually is being reduced or eliminated.

We have a moral obligation to current and future generations to clean up and be responsible for past and current waste generation. That's real waste reduction and waste management!

Decommissioning Program Brings Results

by Tom Nolen

This new column in the P³O *Reporter* will provide updates on waste management activities within the Los Alamos National Laboratory (LANL). Readers have asked for the results in the Laboratory's efforts to manage waste and prevent pollution. In this column the P³O will report what happens "where the wheels meet the road" in LANL's efforts to clean up contamination resulting from 50 years of Laboratory activities.

Decontamination and decommissioning is the most visible activity. Decommissioning personnel from various LANL groups are working to eliminate waste and reduce expenses and manpower and make use of limited disposal space. They use new technologies, new concepts, and effective management to reduce, reuse, and remediate LANL wastes.

Metal Recycling

Tommy Hernandez, one of LANL's specialists in decontamination and decommissioning, provided this P³O reporter with information on metal recycling. In Tommy's words, "Pioneering the decommissioning of metals is one area where efforts to find safe, expeditious, and warranted metal recycling methods can really make a difference." Realistically, metal recycling benefits both budget and environmental safety and health. The metals now being recycled are stainless steel, low-carbon steel, and galvanized metals. These metals vary in levels of contamination. Environmental safety and health personnel are monitoring metals selected for recycling to ensure compliance with

standards for recycled metals. In addition, the search for contractors to handle metal recycling is near completion.

Within the above criteria metal recycling has begun. A cooperative effort is underway to convert metals that meet required standards into B-25 waste containers. At Savannah River, another DOE complex that is recycling metals, the metal is converted into sheets, which are subsequently fabricated into the B-25 waste containers. This joint LANL/Savannah River effort represents a milestone in resolving waste problems in a single program that will benefit both parties.

Metals with radioactivity levels above acceptable standards but not high enough to render them unrecoverable are sent to another contractor, Scientific Ecology Group. This company melts the metals into shielding blocks that are used at LANL and other DOE facilities. (Such blocks are used at the Los Alamos Meson Physics Facility.) This recovery effort is cost-effective.

Compaction

Another highly visible, effective waste management activity is compaction. Waste compaction saves precious, large-volume, permanent, "free release" space where long-term storage is needed and where a small amount of space must be maximized. The decontamination and decommissioning effort has been working with other areas of LANL, and two compactors have been purchased. One recently purchased compactor is designed specifically for use with 55-gallon drums. It uses the 55-gallon drum as the container for compacting personal protection equipment used in cleanup operations and in providing a

safe human working environment in laboratories all over LANL. The compactor reduces the volume of all or most poly-plastic containers, cardboard, and other perishable items that are identified as controlled waste. The compacted waste is placed in steel drums that are themselves considered to be waste, as described in the metal recycling discussion above. This method saves space for more contaminated trash and saves dump-site space.

Another recently purchased compactor is the B-25 Box Compactor, designed to reduce the Laboratory's moving boxes. Some other items targeted for compaction are glove boxes, hoods, ductwork, and plastic labware. Compacting these items will reduce the landfill space needed for permanent disposal of suspect contaminated waste.

Technology

At Technical Area 21, where Buildings 3 and 4 were demolished, the Laboratory used a new approach that allowed materials to be separated as they were generated in the demolition process. An industrial shear literally cut the buildings into smaller pieces. Metal piping, conduit, wood, brick, and concrete were separated out for immediate distribution. This operation enabled a demolition process with reductions in manpower, time, and waste volume.

ICF Kaiser Proves That Waste Minimization Does Apply During Remediation Projects

by Lynn Kidman and Amy Lientz, ICF Kaiser

The Field Unit 3 Team has designated and implemented an aggressive waste-



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reduced total waste volumes more than 90% and has eliminated generation of radioactive, hazardous, and mixed wastes.

Waste minimization is important to the remedial feasibility investigations not only for reducing the significant expense associated with waste management and disposal but also to reduce or eliminate future liability. Lynn Kidman, ICF Kaiser, stated that total waste volumes were reduced more than 90%, and radioactive, hazardous, and mixed waste were completely eliminated through implementation of the following waste minimization techniques:

- Waste characterization and segregation techniques implemented at the point of generation eliminated cross contamination.

- Generation of water and other materials used in decontamination was minimized by carefully preventing their contact with soils. For example, only one person within the contamination zone (CZ) was allowed to take the samples, and all persons within the CZ were requested not to kneel or touch potentially contaminated soils, thus preventing contact and the creation of an unnecessary waste stream.

- Disposables were replaced by reusable equipment and supplies. Field personnel wear cloth, rather than Tyvek™, coveralls.

minimization plan for the Environmental Restoration (ER) Project at Los Alamos National Laboratory. The ER Project has re-

- A dry decontamination step was introduced to reduce decontamination sediments in the wet decontamination line and the amount of liquids required to clean personnel and equipment effectively.

- Equipment and supplies from the exclusion zone that were not exposed to potentially contaminated media were not decontaminated.

- Decontamination fluids (with sediments) were returned to the site from which the environmental media (soil) was collected.

- Equipment was decontaminated at the site of generation.

- The characteristic of radioactivity was determined before contamination to avoid the generation of mixed wastes.

By reducing waste at Field Unit 3 through the above techniques, Lynn Kidman concluded that the following quantities of waste were avoided:

Waste Type	Quantity Avoided
Hazardous Equipment and Supplies	77 barrels
Hazardous Personal Protective Equipment	77 barrels
Hazardous Decontamination Water	42 barrels

By avoiding this quantity of waste, ICF Kaiser and the LANL ER program for Field Unit 3 are experiencing an approximate annual savings of \$75 K.

Lynn Kidman credits much of Field Unit 3's success to the ideas of the people in the field doing the work. The Field Unit 3 Team recently developed a video of their waste-minimization success story. It will be available soon so other field units can learn from what Field Unit 3 has done.

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